

AF/2834



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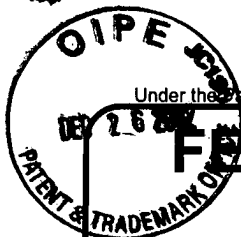
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| TRANSMITTAL FORM <i>(to be used for all correspondence after initial filing)</i> | Application Number | 09/590,797 |
| | Filing Date | 06/09/2000 |
| | First Named Inventor | Phillips D. Rockwell |
| | Group Art Unit | 2834 |
| | Examiner Name | Thanh Lam |
| Total Number of Pages in This Submission | | 50 |
| Attorney Docket Number | | ROC0001U |

| ENCLOSURES (check all that apply) | | |
|--|---|---|
| <input checked="" type="checkbox"/> Fee Transmittal Form <input checked="" type="checkbox"/> Fee Attached <input type="checkbox"/> Amendment / Reply <input type="checkbox"/> After Final <input type="checkbox"/> Affidavits/declaration(s) <input type="checkbox"/> Extension of Time Request <input type="checkbox"/> Express Abandonment Request <input type="checkbox"/> Information Disclosure Statement <input type="checkbox"/> Certified Copy of Priority Document(s) <input type="checkbox"/> Response to Missing Parts/ Incomplete Application <input type="checkbox"/> Response to Missing Parts under 37 CFR 1.52 or 1.53 | <input type="checkbox"/> Assignment Papers (for an Application) <input type="checkbox"/> Drawing(s) <input type="checkbox"/> Licensing-related Papers <input type="checkbox"/> Petition <input type="checkbox"/> Petition to Convert to a Provisional Application <input type="checkbox"/> Power of Attorney, Revocation Change of Correspondence Address <input type="checkbox"/> Terminal Disclaimer <input type="checkbox"/> Request for Refund <input type="checkbox"/> CD, Number of CD(s) _____ | <input type="checkbox"/> After Allowance Communication to Group <input type="checkbox"/> Appeal Communication to Board of Appeals and Interferences <input checked="" type="checkbox"/> Appeal Communication to Group (Appeal Notice, Brief, Reply Brief) <input type="checkbox"/> Proprietary Information <input type="checkbox"/> Status Letter <input type="checkbox"/> Other Enclosure(s) (please identify below): |
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| SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT | |
|--|-------------------------------|
| Firm or Individual name | James J. Leary, Reg No 35,237 |
| Signature | |
| Date | December 16, 2002 |

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| | |
|----------------------|----------------------|
| Application Number | 09/590,797 |
| Filing Date | 06/09/2000 |
| First Named Inventor | Phillips D. Rockwell |
| Examiner Name | Thanh Lam |
| Group Art Unit | 2834 |
| Attorney Docket No. | ROC0001U |

METHOD OF PAYMENT

- 1.
- ☐
- The Commissioner is hereby authorized to charge indicated fees and credit any overpayments to:

Deposit Account Number
Deposit Account Name ☐ Charge Any Additional Fee Required Under 37 CFR 1.16 and 1.17☒ Applicant claims small entity status. See 37 CFR 1.27

- 2.
- ☒
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☒ Check ☐ Credit card ☐ Money Order ☐ Other**FEE CALCULATION****1. BASIC FILING FEE**

| Large Entity Fee Code | Small Entity Fee Code | Fee Description | Fee Paid |
|-----------------------|-----------------------|------------------------|----------|
| 101 740 | 201 370 | Utility filing fee | |
| 106 330 | 206 165 | Design filing fee | |
| 107 510 | 207 255 | Plant filing fee | |
| 108 740 | 208 370 | Reissue filing fee | |
| 114 160 | 214 80 | Provisional filing fee | |

SUBTOTAL (1) (\$) **2. EXTRA CLAIM FEES**

| Total Claims | Extra Claims | Fee from below | Fee Paid |
|--------------------|------------------------------|------------------------|------------------------|
| Independent Claims | -20** = <input type="text"/> | X <input type="text"/> | = <input type="text"/> |
| Multiple Dependent | -3** = <input type="text"/> | X <input type="text"/> | = <input type="text"/> |

| Large Entity Fee Code | Small Entity Fee Code | Fee Description |
|-----------------------|-----------------------|--|
| 103 18 | 203 9 | Claims in excess of 20 |
| 102 84 | 202 42 | Independent claims in excess of 3 |
| 104 280 | 204 140 | Multiple dependent claim, if not paid |
| 109 84 | 209 42 | ** Reissue independent claims over original patent |
| 110 18 | 210 9 | ** Reissue claims in excess of 20 and over original patent |

SUBTOTAL (2) (\$)

**or number previously paid, if greater; For Reissues, see above

FEE CALCULATION (continued)**3. ADDITIONAL FEES**

| Large Entity Fee Code | Small Entity Fee Code | Fee Description | Fee Paid |
|-----------------------|-----------------------|--|----------|
| 105 130 | 205 65 | Surcharge - late filing fee or oath | |
| 127 50 | 227 25 | Surcharge - late provisional filing fee or cover sheet | |
| 139 130 | 139 130 | Non-English specification | |
| 147 2,520 | 147 2,520 | For filing a request for <i>ex parte</i> reexamination | |
| 112 920* | 112 920* | Requesting publication of SIR prior to Examiner action | |
| 113 1,840* | 113 1,840* | Requesting publication of SIR after Examiner action | |
| 115 110 | 215 55 | Extension for reply within first month | |
| 116 400 | 216 200 | Extension for reply within second month | |
| 117 920 | 217 460 | Extension for reply within third month | |
| 118 1,440 | 218 720 | Extension for reply within fourth month | |
| 128 1,960 | 228 980 | Extension for reply within fifth month | |
| 119 320 | 219 160 | Notice of Appeal | |
| 120 320 | 220 160 | Filing a brief in support of an appeal | 160.00 |
| 121 280 | 221 140 | Request for oral hearing | |
| 138 1,510 | 138 1,510 | Petition to institute a public use proceeding | |
| 140 110 | 240 55 | Petition to revive - unavoidable | |
| 141 1,280 | 241 640 | Petition to revive - unintentional | |
| 142 1,280 | 242 640 | Utility issue fee (or reissue) | |
| 143 460 | 243 230 | Design issue fee | |
| 144 620 | 244 310 | Plant issue fee | |
| 122 130 | 122 130 | Petitions to the Commissioner | |
| 123 50 | 123 50 | Processing fee under 37 CFR 1.129(a) | |
| 126 180 | 126 180 | Submission of Information Disclosure Statement | |
| 581 40 | 581 40 | Recording each patent assignment per property (times number of properties) | |
| 146 740 | 246 370 | Filing a submission after final rejection (37 CFR § 1.129(a)) | |
| 149 740 | 249 370 | For each additional invention to be examined (37 CFR § 1.129(b)) | |
| 179 740 | 279 370 | Request for Continued Examination (RCE) | |
| 169 900 | 169 900 | Request for expedited examination of a design application | |

Other fee (specify)

*Reduced by Basic Filing Fee Paid

SUBTOTAL (3) (\$) 160.00**SUBMITTED BY**

Name (Print/Type) James J. Leary

Registration No. 35,237
(Attorney/Agent)**Complete (if applicable)**

Telephone 510-742-7417

Signature

Date 12/16/2002

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#9/appeal Brief
Hawkins
1/15/03

IN THE U.S. PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of:

Applicant: Phillips D. Rockwell

Examiner Thanh Lam

Serial No.: 09/590,797

Art Unit: 2834

Filed: June 9, 2000

For: ORBITAL VIBRATOR

Commissioner of Patents and Trademarks
Washington, District of Columbia 20231

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APPEAL BRIEF

This is an appeal from the final rejection by the Examiner dated June 7, 2002, rejecting claims 1-33, all of the claims then pending in the case.

REAL PARTY IN INTEREST

The real party of interest in the present appeal is:

Phillips D. Rockwell

RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences pending in the USPTO.

STATUS OF AMENDMENTS

Amendment A, which was filed on April 4, 2002, has been entered.

12/30/2002 NMDHAMM1 00000107 09590797

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160.00 OP

STATUS OF THE CLAIMS

The application was filed on June 9, 2000 with original claims 1-33.

Amendment A, filed on April 4, amended claims 1 and 13 and added new claims 32-33.

Claims 1-33 are currently pending.

Claims 1-33 stand rejected.

SUMMARY OF THE INVENTION

Appellant's invention is directed to an orbital vibrator apparatus 10 for generating orbital vibrations and which is also capable of multimode operation. The orbital vibrator apparatus 10, which is shown in a perspective view in FIG 1 of the application, is intended primarily for agitation and transportation of material, typically particulate material. The orbital vibrator apparatus 10 has a base 12 mounted on vibration isolation mounts 16. An armature plate 20 is resiliently mounted to the base by three rods 22 of spring steel, fiberglass or other resilient material that serve as flexural spring elements. An armature 28 of magnetically attracted material is mounted to the armature plate 20. A first electromagnet 34 and a second electromagnet 36 are mounted on the base 12 in a spaced apart relationship to the armature 28. In one particularly preferred embodiment, the first and second electromagnets 34, 36 are mounted at right angles to one another and the armature 28 is made of a first armature bar 30 and a second armature bar 32, with the first electromagnet 34 mounted in a spaced apart relationship to the first armature bar 30, and the second electromagnet 36 mounted in a spaced apart relationship to the second armature bar 32. A source 50 of single-phase alternating current is connected to the first electromagnet 34 and the second electromagnet 36 by way of a control circuit 52. The control circuit 52 includes a variable voltage transformer 54 for controlling the voltage of the electric current and a phase shifting circuit 56. The phase shifting circuit 56 shifts the phase of the alternating current by approximately ninety degrees. The first electromagnet 34 is driven directly from the output of the voltage transformer 54 and the second electromagnet 36 is driven from the

output of the phase shifting circuit 56. The motion that results from the two electromagnets 34, 36 acting on the armature 28 ninety degrees out of phase from each other will be approximately circular. The control circuit 52 also includes a mode selector switch 60 for selectively operating the vibration generator in a circular orbital vibratory mode, an elliptical vibratory mode and a reciprocating vibratory mode. The operation of the circular orbital vibratory mode has been described above. To operate the vibrator apparatus 10 in a reciprocating vibratory mode, the mode selector switch 60 connects the circuit so that only one of the electromagnets 34 or 36 is driven by the alternating current source 50. Alternatively, the mode selector switch 60 can bypass the phase shifting circuit 56 so that both of the electromagnets 34 and 36 are driven in phase with one another. To operate the vibrator apparatus 10 in an elliptical vibratory mode, the mode selector switch 60 connects the circuit in such a way that one of the electromagnets 34 or 36 is driven with a higher driving voltage than the other. The resulting motion of the armature 28 is elliptical. This can be accomplished with a second voltage transformer or with a simple resistance load or variable resistor on one branch of the circuit.

ISSUES

1. Are claims 1-4, 13-16, 21 and 28-33 properly rejected under 35 U.S.C. § 102(b) as anticipated by Snyder (U.S. patent 5,160,393)?
2. Are claims 5-11 and 17-20 properly rejected under 35 U.S.C. § 103(a) as being unpatentable over Snyder (U.S. patent 5,160,393)?
3. Are claims 12 and 22-27 properly rejected although no statutory basis for their rejection was provided?

GROUPING OF CLAIMS

With respect to Issues 1, 2 and 3, the claims stand or fall separately.

ARGUMENT

ISSUE 1 - Are claims 1-4, 13-16, 21 and 28-33 properly rejected under 35 U.S.C. § 102(b) as anticipated by Snyder (U.S. patent 5,160,393)?

Appellant submits that the Office Action has not established a case for anticipation under 35 U.S.C. § 102(b). The Federal Circuit has stated on multiple occasions that in order to reject under § 102, there must be identity of invention. See, Akzo N.V. v. U.S. International Trade Commission, 1 USPQ2d 1241, 1245 (Fed. Cir. 1986): “Under 35 U.S.C. § 102, anticipation requires that each and every element of the claimed invention be disclosed in the prior art”, cert. denied, 482 U.S. 909 (1987). Moreover, an anticipatory reference must be *enabling* and teach all aspects of the claimed invention. Scripps Clinic & Research v. Genetech Inc., 18 USPQ2d 1001, 1010 (Fed. Cir. 1991): “Invalidity for anticipation requires that all of the elements and limitations of the claim are found within a single prior art reference... There must be no difference between the claimed invention and the reference disclosure, as viewed by one of ordinary skill in the field of the invention.” The initial burden is on the Patent Office to show that identity of invention exists. In re Warner, 154 USPQ 173, 177 (CCPA 1967), cert. denied, 389 U.S. 1057 (1968).

The Office Action has not met this burden.

Claim 1

Independent claim 1 distinguishes over Snyder by recitation of the novel and nonobvious features of:

a circuit for generating electrical pulses having a first output connected to said first electromagnet and a second output connected to said second electromagnet, said circuit configured for selectively operating the vibration generator in a circular orbital vibratory mode, *an elliptical vibratory mode* and a reciprocating vibratory mode.

As shown and described, the frictional welder of Snyder is configured to operate in an orbital (circular) vibratory mode or in one of three translational (reciprocating) vibratory modes. (See Snyder FIG 11; Abstract, line 7; col. 1, line 18; col. 2, lines 17-20; etc.) Snyder does not disclose or suggest a circuit configured to or capable of operating the frictional welder in an elliptical vibratory mode. Examiner, in his remarks on pages 2, 3 and 4 of the Office Action, erroneously states that Snyder discloses that the friction welder operates in *an elliptical vibratory mode* in addition to these other modes. Applicant submits that this is a convenient fiction contrived by Examiner to support an erroneous and unsupported rejection.

Appellant submits that the rejection of claim 1 under 35 U.S.C. § 102(b) as anticipated by Snyder is in error and respectfully requests that the rejection be reversed.

Claims 2-4, 13-16, 21 and 32

Claims 2-4, 13-16, 21 and 32, being dependent on claim 1, distinguish over Snyder by recitation of the same novel and nonobvious features noted above.

Furthermore, the Office Action has not met the required burden of showing anticipation of claims 2-4, 13-16, 21 and 32. Examiner's remarks regarding claims 2-4, 13-16, 21 and 32 on pages 2-4 of the Office Action merely recite Applicant's claim language without any indication how these features relate to the grounds of rejection or to the cited reference.

Appellant submits that the rejection of claims 2-4, 13-16, 21 and 32 under 35 U.S.C. § 102(b) as anticipated by Snyder is in error and respectfully requests that the rejection be reversed.

Claim 28

Independent claim 28 distinguishes over Snyder by recitation of the novel and nonobvious features of:

a source of alternating current *configured to deliver alternating current to said first electromagnet at a first amplitude and to said second electromagnet at a second amplitude, thereby inducing an elliptical motion in said armature.*

As shown in FIG 11, the frictional welder of Snyder is configured to deliver alternating current at the same amplitude to all three of the electromagnets when operating in an orbital vibratory mode, resulting in a circular motion of the armature, or to deliver alternating current to only one of the electromagnets when operating in a translational vibratory mode, resulting in a reciprocating motion of the armature. Snyder does not disclose or suggest a circuit configured to deliver alternating current at different amplitudes to the electromagnets to induce an elliptical motion in the armature. Furthermore, Snyder does not disclose or suggest any circuit configured to or capable of operating the frictional welder in an elliptical vibratory mode.

Appellant submits that the rejection of claim 28 under 35 U.S.C. § 102(b) as anticipated by Snyder is in error and respectfully requests that the rejection be reversed.

Claims 29-31

Claims 29-31, being dependent on claim 28, distinguish over Snyder by recitation of the same novel and nonobvious features noted above.

Furthermore, the Office Action has not met the required burden of showing anticipation of claims 29-31. Examiner's remarks regarding claims 29-31 on pages 3-4 of the Office Action merely recite Applicant's claim language without any indication how these features relate to the grounds of rejection or to the cited reference.

Appellant submits that the rejection of claims 21-31 under 35 U.S.C. § 102(b) as anticipated by Snyder is in error and respectfully requests that the rejection be reversed.

Claim 33

Independent claim 33 distinguishes over Snyder by recitation of the novel and nonobvious features of:

a circuit for generating electrical pulses having a first output connected to said first electromagnet and a second output connected to said second electromagnet, *said circuit configured to deliver electrical pulses to said second electromagnet at a variable phase angle with respect to said first electromagnet*, thereby inducing an orbital motion in said armature.

Snyder does not disclose or suggest a circuit configured to deliver electrical pulses to the electromagnets with a variable phase angle between the pulses. When operating in orbital (circular) vibratory mode, the frictional welder of Snyder operates with a three-phase electrical input that delivers electrical pulses to the electromagnets with a fixed phase angle between the pulses. When operating in translational vibratory (reciprocating) mode, the frictional welder of Snyder sends electrical pulses to only one of the electromagnets, therefore the concept of a phase angle between the pulses does not apply.

Appellant submits that the rejection of claim 33 under 35 U.S.C. § 102(b) as anticipated by Snyder is in error and respectfully requests that the rejection be reversed.

ISSUE 2 - Are claims 5-11 and 17-20 properly rejected under 35 U.S.C. § 103(a) as being unpatentable over Snyder (U.S. patent 5,160,393)?

Appellant submits that the Office Action has not established a *prima facie* case of obviousness under 35 U.S.C. § 103(a). To establish a *prima facie* case of obviousness, the Office

Action must achieve three objectives: (1) The Office Action must demonstrate suggestion or motivation, either in the references themselves or in the prior art, to modify the reference as suggested by the Office Action or to combine the references as suggested by the Office Action; (2) The Office Action must establish that the proposed combination has a reasonable expectation of success; and (3) The Office Action must demonstrate that each claim limitation in each claim is taught or suggested in the cited references. M.P.E.P. § 706.02(j).

The Office Action has not met this burden.

Claims 5-11 and 17-20

Claims 5-11 and 17-20, being dependent on claim 1, distinguish over Snyder by recitation of the novel and nonobvious features of:

a circuit for generating electrical pulses having a first output connected to said first electromagnet and a second output connected to said second electromagnet, said circuit configured for selectively operating the vibration generator in a circular orbital vibratory mode, *an elliptical vibratory mode* and a reciprocating vibratory mode.

Appellant submits that the Office Action does not establish a *prima facie* case of obviousness with regard to claims 5-11 and 17-20. As shown and described, the frictional welder of Snyder is configured to operate in an orbital (circular) vibratory mode or in one of three translational (reciprocating) vibratory modes. (See Snyder FIG 11; Abstract, line 7; col. 1, line 18; col. 2, lines 17-20; etc.) Snyder does not disclose a circuit configured to or capable of operating the frictional welder in *an elliptical vibratory mode*. Furthermore, there is no suggestion in the cited reference that would lead one of ordinary skill in the art to make the modifications to the frictional welder that would be necessary to arrive at the claimed invention.

Appellant submits that the rejection of claims 5-11 and 17-20 under 35 U.S.C. 103(a) as being unpatentable over Snyder is in error and respectfully requests that the rejection be reversed.

ISSUE 3 - Are claims 12 and 22-27 properly rejected although no statutory basis for their rejection was provided?

Claim 12

Claim 12 is mentioned on page 3 of the Detailed Action, however no statutory basis for the rejection is provided by Examiner. Furthermore, Examiner's remarks regarding claim 12 merely recite Applicant's claim language without any indication how these features relate to any grounds of rejection.

Claims 22-27

Claims 22-27 were allowed in the previous Office Action mailed on October 4, 2001. These claims are now listed as rejected on the Office Action Summary, but no statutory basis for their rejection is provided by Examiner in the Detailed Action.

Claim 27 is mentioned on page 3 of the Detailed Action, however no statutory basis for the rejection is provided by Examiner. Furthermore, Examiner's remarks regarding claim 27 merely recite Applicant's claim language without any indication how these features relate to any grounds of rejection.

Claim 22 is mentioned on page 4 of the Detailed Action, however no statutory basis for the rejection is provided by Examiner.

Claims 23-26 are listed as rejected on the Office Action Summary, but there is no mention of them in the Detailed Action and no statutory basis for their rejection is provided by Examiner.

Moreover, independent claim 22 distinguishes over Snyder by recitation of the novel and nonobvious features of:

a source of alternating current connected to said first electromagnet and to an input of *a phase shifting circuit, an output of said phase shifting circuit being connected to said second electromagnet.*

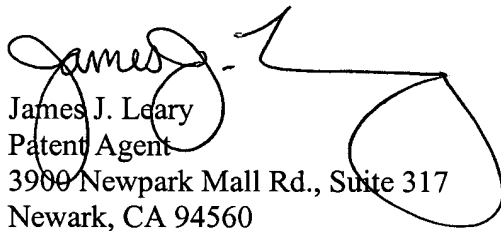
Snyder does not disclose or suggest *a phase shifting circuit*. Furthermore, there is no suggestion in the cited reference that would lead one of ordinary skill in the art to make the modifications to the frictional welder that would be necessary to arrive at the claimed invention. Claim 22 is therefore submitted to be patentable over Snyder under 35 U.S.C. § 102(b) and 35 U.S.C. § 103(a).

Claims 23-27, being dependent on claim 22, distinguish over Snyder by recitation of the same novel and nonobvious features noted above. Claims 23-27 are therefore submitted to be patentable over Snyder under 35 U.S.C. § 102(b) and 35 U.S.C. § 103(a).

CONCLUSION

For all the foregoing reasons, it is submitted that Examiner's rejection of claims 1-33 was in error, and reversal of the Examiner's decision is respectfully requested.

Very respectfully submitted,


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APPENDIX A
CLAIMS ON APPEAL

The claims currently pending in the application are:

1. A vibrator apparatus comprising:
 - a base;
 - an armature plate resiliently mounted to said base;
 - an armature of magnetically attracted material mounted to said armature plate;
 - a first electromagnet mounted to said base in a spaced apart relationship to said armature;
 - a second electromagnet mounted to said base in a spaced apart relationship to said armature; and
 - a circuit for generating electrical pulses having a first output connected to said first electromagnet and a second output connected to said second electromagnet, said circuit configured for selectively operating the vibration generator in a circular orbital vibratory mode, an elliptical vibratory mode and a reciprocating vibratory mode.
2. The vibrator apparatus of claim 1, wherein said circuit is configured to deliver electrical pulses to said first electromagnet and said second electromagnet at a variable frequency.
3. The vibrator apparatus of claim 1, wherein said circuit is configured to deliver electrical pulses to said first electromagnet and said second electromagnet at a variable phase angle.
4. The vibrator apparatus of claim 1, wherein said circuit is configured to deliver electrical pulses to said first electromagnet and said second electromagnet with a variable duty cycle.

5. The vibrator apparatus of claim 1, wherein said circuit is configured for connection to a source of alternating current and wherein said circuit comprises a frequency doubler for doubling a frequency of the alternating current.

6. The vibrator apparatus of claim 1, wherein said circuit is configured for connection to a source of alternating current and wherein said circuit comprises a frequency divider for reducing a frequency of the alternating current to a desired operating frequency.

7. The vibrator apparatus of claim 1, wherein said circuit comprises an oscillator for generating electrical pulses at a selected oscillator frequency and a frequency divider for reducing the oscillator frequency to a desired operating frequency.

8. The vibrator apparatus of claim 7, wherein said oscillator comprises an RC oscillator.

9. The vibrator apparatus of claim 7, wherein said oscillator comprises a crystal oscillator.

10. The vibrator apparatus of claim 1, wherein said circuit comprises a microprocessor for controlling said circuit to deliver electrical pulses to said first electromagnet and said second electromagnet at a selected frequency, phase angle and duty cycle based on user input.

11. The vibrator apparatus of claim 1, wherein said circuit comprises a source of electrical pulses and a pulse counter for selectively delivering the electrical pulses to said first electromagnet and said second electromagnet at a selected phase angle.

12. The vibrator apparatus of claim 1, wherein said circuit comprises a source of electrical pulses at a source frequency and a frequency divider for reducing the source frequency to a desired operating frequency and a pulse counter for selectively delivering the electrical pulses to said first electromagnet and said second electromagnet at a selected phase angle.

13. The vibrator apparatus of claim 1, wherein said circuit comprises a mode selector switch for selectively operating the vibration generator in the circular orbital vibratory mode, the elliptical vibratory mode and the reciprocating vibratory mode.

14. The vibrator apparatus of claim 1, wherein said armature comprises a first armature bar and a second armature bar, said first electromagnet being mounted in a spaced apart relationship to said first armature bar, and said second electromagnet being mounted in a spaced apart relationship to said second armature bar.

15. The vibrator apparatus of claim 14, wherein said first electromagnet is mounted at approximately a right angle to said second electromagnet.

16. The vibrator apparatus of claim 1, wherein said armature plate is resiliently mounted to said base by a multiplicity of flexural spring elements.

17. The vibrator apparatus of claim 16, wherein said armature plate is resiliently mounted to said base by three flexural spring elements.

18. The vibrator apparatus of claim 16, wherein said flexural spring elements are constructed of spring steel.

19. The vibrator apparatus of claim 16, wherein said flexural spring elements are approximately round in cross section.

20. The vibrator apparatus of claim 16, wherein said flexural spring elements are adjustable to vary a spring rate of said flexural spring elements.

21. The vibrator apparatus of claim 1, wherein said armature plate is resiliently mounted to said base by an adjustable rate spring element.

22. A vibrator apparatus comprising:
a base;
an armature plate resiliently mounted to said base;
an armature of magnetically attracted material mounted to said armature plate;
a plurality of electromagnets, including a first electromagnet and a second electromagnet, said first electromagnet mounted to said base in a spaced apart relationship to said armature, and said second electromagnet mounted to said base in a spaced apart relationship to said armature;
and
a source of alternating current connected to said first electromagnet and to an input of a phase shifting circuit, an output of said phase shifting circuit being connected to said second electromagnet.

23. The vibrator apparatus of claim 22, wherein said first electromagnet is mounted at a mounting angle with respect to said second electromagnet and said phase shifting circuit phase shifts the alternating current from said source of alternating current by a phase shift angle approximately equal to said mounting angle.

24. The vibrator apparatus of claim 22, wherein said first electromagnet is mounted at approximately a right angle to said second electromagnet, and said phase shifting circuit phase shifts the alternating current from said source of alternating current by a phase shift angle of approximately ninety degrees.

25. The vibrator apparatus of claim 22, further comprising a variable voltage transformer connected to said source of alternating current.

26. The vibrator apparatus of claim 22, wherein said armature is permanently magnetized.

27. The vibrator apparatus of claim 22, wherein said circuit comprises a mode selector switch for selectively operating the vibration generator in a circular orbital vibratory mode, an elliptical vibratory mode and a reciprocating vibratory mode.

28. A vibrator apparatus comprising:

a base;

an armature plate resiliently mounted to said base;

an armature of magnetically attracted material mounted to said armature plate;

a plurality of electromagnets, including a first electromagnet and a second electromagnet, said first electromagnet mounted to said base in a spaced apart relationship to said armature, and said second electromagnet mounted to said base in a spaced apart relationship to said armature; and

a source of alternating current configured to deliver alternating current to said first electromagnet at a first amplitude and to said second electromagnet at a second amplitude, thereby inducing an elliptical motion in said armature.

29. The vibrator apparatus of claim 28, further comprising means for varying said first amplitude and said second amplitude.

30 The vibrator apparatus of claim 28, wherein said source of alternating current is configured to deliver alternating current to said first electromagnet at a variable phase angle with respect to said second electromagnet.

31. The vibrator apparatus of claim 28, wherein said circuit comprises a mode selector switch for selectively operating the vibration generator in a circular orbital vibratory mode, an elliptical vibratory mode and a reciprocating vibratory mode.

32. The vibrator apparatus of claim 22, wherein said phase shifting circuit is configured to deliver electrical pulses to said first electromagnet and said second electromagnet at a variable phase shift angle.

33. A vibrator apparatus comprising:

a base;

an armature plate resiliently mounted to said base;

an armature of magnetically attracted material mounted to said armature plate;

a first electromagnet mounted to said base in a spaced apart relationship to said armature;

a second electromagnet mounted to said base in a spaced apart relationship to said

armature; and

a circuit for generating electrical pulses having a first output connected to said first electromagnet and a second output connected to said second electromagnet, said circuit configured to deliver electrical pulses to said second electromagnet at a variable phase angle with respect to said first electromagnet, thereby inducing an orbital motion in said armature.